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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/749,636	12/28/2000	Yoshinobu Suehiro	P 275747 TYGUS001	6023

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EXAMINER	
KEANEY, ELIZABETH MARIE	
ART UNIT	PAPER NUMBER
2882	

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Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center">Office Action Summary</p>	Application No. 09/749,636	Applicant(s) SUEHIRO ET AL.	
	Examiner Elizabeth Gemmell	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-22 is/are rejected.
- 7) ☒ Claim(s) 3, 4, 7, 20 and 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Receipt is acknowledged of the Amendments and the Request for Continued Examination filed 9 October 2003.

Response to Arguments

Applicant's arguments with respect to claims 1,2,4-8,22,29 and 30 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

Claims 3,4,7,20 and 22 are objected to because of the following informalities:

- Claim 3 recites the limitation "the sealing mass" in line 2. There is insufficient antecedent basis for this limitation in the claim.
- Claim 4, line 1: "described in 1,"; should be --described in claim 1,--.
- Claim 7 recites the limitation "the light-transmissible material" in line 15. There is insufficient antecedent basis for this limitation in the claim.
- Claim 20 recites the limitation "the lead assembly" in line 2. There is insufficient antecedent basis for this limitation in the claim.
- Claim 22, line 10: "outside,"; should be --outside.--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 5,9-12,14-17 and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Kamada et al. (US Patent 6,331,063; hereinafter Kamada).

Re claim 5: Kamada discloses, in figure 1 and throughout the disclosure, a light-emitting diode comprising:

- a light-emitting element (1, the one being on the right hand side);
- a lead assembly for supplying electrical power to the light-emitting element (14);
- a metal plate (10), preformed into a concave shape (11), that forms a reflection mirror, the reflection mirror provided in an opposing relation to the light-emitting surface of the light-emitting element, the light-emitting

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element being mounted a predetermined distance from a reflective surface of the reflection mirror,

- wherein the reflection mirror comprises a metal mirror which is obtained by mirror-surface treating the concave surface of the metal mirror (column 4, line 33); and
- a radiation surface (15) for radiating light reflected on the reflection mirror to the outside.

The examiner notes, regarding the limitation “reflection mirror provided in an opposing relation to the light-emitting surface of the light-emitting element”, that the examiner has interpreted the reflection mirror surface (11a) on the left hand side of the concave mirror to be in opposing relation to the LED element (1) which is on the right hand side of the dent (11).

Re claim 9: Kamada discloses, in figure 1 and throughout the disclosure, a light-emitting diode comprising:

- a light emitting element (1);
- a concave reflection mirror (11a) provided in an opposing relation to the light-emitting surface of the light emitting element, light emitted by the light-emitting element being reflected on the reflection mirror, to be radiated to the outside,
 - wherein the reflection mirror comprises a mirror which is obtained by processing a metal plate (column 15, lines 2-4) to give it a concave

shape, and the reflection mirror having a linear reflectance of 65% or higher.

Regarding the limitation of “the reflection mirror having a linear reflectance of 65% or higher”, since the mirror is made of metal, no light will be absorbed therefore the mirror will have a linear reflectance of 100% which is within the range disclosed by the applicant.

Re claim 10: The Examiner notes the claim limitation “coining” is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent of showing an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

Re claim 11: Kamada discloses the metal mirror having a mirror-surface-treatment on its concave surface (column 4, line 33).

Re claim 12: Kamada discloses the reflection mirror being obtained by mirror-surface treating the concave surface of the metal mirror (column 4, line 33).

Re claim 14: The Examiner notes the claim limitation “preparing...concave shape” is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent of showing an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

Re claim 15: Kamada discloses the metal plate serving as a material of the reflection mirror comprises one of copper, iron, and alloys mainly composed of those metals (column 3, line 61).

Re claim 16: Kamada discloses the metal plate serving as a material of the reflection mirror comprising one of aluminum and alloys mainly composed on aluminum (column 8, line 49).

Re claim 17: The Examiner notes the claim limitation “alumite treatment” is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent of showing an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

Re claim 22: Kamada discloses, in figure 1 and throughout the disclosure, a light-emitting diode comprising:

- a light-emitting element (1);
- a lead assembly for supplying electrical power to the light-emitting element (14);
- a metal plate (10), preformed into a concave shape (11), that forms a reflection mirror, the reflection mirror provided in an opposing relation to the light-emitting surface of the light-emitting element, the light-emitting element being mounted a predetermined distance from a reflective surface of the reflection mirror,
- a light-transmissible material for sealing the light-emitting element, a part of the lead assembly and the reflection mirror (column 4, line 35); and
- a radiation surface (15) for radiating light reflected on the reflection mirror to the outside.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,3-9,12,13,19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suehiro et al. (US Patent 5,623,181; hereinafter Suehiro) in view of Kamada.

Re claims 1,5,9 and 13: Suehiro discloses in figure 3 and throughout the disclosure, a light-emitting diode comprising:

- a light-emitting element (111);
- a lead assembly for supplying electrical power to the light-emitting element (122a,b);
- a reflection mirror provided in an opposing relation to the light-emitting surface of the light-emitting element (114), the light emitting element being a predetermined distance from a reflective surface of the reflection mirror;
- a light-transmissible material for sealing the light-emitting element, a part of the lead assembly and the reflection mirror (113);
- a radiation surface for radiating light reflected on the reflection mirror to the outside (115), wherein the radiation surface is formed on the light-transmissible material at its surface at the rear of the light-emitting element.

However, Suehiro fails to teach or fairly suggest the reflection mirror being formed by a metal plate pre-formed into a concave shape and a through-hole formed in the reflection mirror.

Kamada discloses a reflection mirror being formed by a metal plate pre-formed into a concave shape (column 15, line 13) and a through-hole formed in the reflection mirror (figure 26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a pre-formed metal plate mirror within the LED disclosed by Suehiro in order to reduce manufacturing times, materials and inaccuracies with reflective film deposits.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a through-hole within the reflection mirror in order to provide an escape for the heat generated by the LED.

Re claim 3: Suehiro discloses the distance from the edge of the reflective mirror to the edge of the sealing mass made of the light transmissible material is less than 1.0mm. Suehiro discloses the light transmissible material filling the entire concave opening, therefore the light transmissible material will butt up against the reflective mirror thereby making the distance less than 1.0 mm.

Re claim 4: Suehiro discloses, in figure 17 and throughout the disclosure, the light-transmissible material is essentially shaped like a square when viewed from the side of the radiation surface and the lead assembly is led to the outside from the base of the light-transmissible material close to a corner of the square.

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Re claim 5: Suehiro discloses the reflection mirror comprising a metal mirror, which is obtained by mirror-surface-treating the concave surface (column 5, line 12).

Re claim 6: Suehiro discloses, in figure 3 and throughout the disclosure, the light-emitting element (111), part of the lead assembly (112a,b), and the reflection mirror (114) are sealed with a light-transmissible material (113) and the radiation surface (115) is formed on the light-transmissible material at its surface at the rear of the light-emitting element.

Re claim 7: Suehiro discloses, in figure 2 and throughout the disclosure, a case for containing the light-emitting element, a part of the lead assembly, and the reflection mirror (130).

Re claim 8: Suehiro shows all the limitations above.

However, Suehiro fails to teach or fairly suggest the reflective mirror formed of ceramic.

Kamada discloses a reflection mirror comprised of ceramic (column 3, line 54).

It would have been obvious to substitute a ceramic reflective mirror for that of a metal mirror in order to improve the insulation properties of the overall LED (column 3, line 55).

Re claim 9: Suehiro discloses the reflection mirror having a linear reflectance of 65% or higher. Since the mirror is made of metal, no light will be absorbed therefore the mirror will have a linear reflectance of 100% which is within the range disclosed by the applicant.

Re claim 12: Suehiro discloses the reflection mirror being obtained by mirror-surface treating the concave surface of the metal mirror (column 5, line 12).

Re claim 19: Suehiro discloses, in figure 19, the reflection mirror includes around its circumference a rim whose surface extends in a direction parallel with a plane essentially perpendicular to the central axis of the reflection mirror (517).

Re claim 20: Suehiro discloses, in figure 4 and throughout the disclosure, the lead assembly (12a,b) with the light-emitting diode mounted thereon (11) is disposed in close relation to the reflection mirror.

Claims 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suehiro and Kamada in view of Singer et al. (US Patent 5,183,752; hereinafter Singer).

Re claim 18: Suehiro and Kamada show all the limitations above.

However, they fail to teach or fairly suggest the use of a light-emitting element that emits light in the ultra-violet region.

Singer teaches the use of an UV LED (column 1, line 57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the light-emitting device of Suehiro and Kamada with that of a UV LED in order to improve the overall light emission of the light-emitting device. Thereby, the device produces a brighter light without any additional power usage.

Re claim 21: Suehiro, Kamada and Singer show all the limitations above. Suehiro further discloses, in figure 8, a lead assembly mount having a recess (182a). Singer further discloses a fluorescent material to convert the light emitted by the light emitting element to light of a different wavelength (figure 1, 32).

However, Suehiro, Kamada and Singer fail to teach or suggest a mount recess having a mouth, which opens towards the reflection mirror with the center of the mount being in alignment with the central axis of the reflection mirror.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a lead assembly mount having a recess, which opens towards the reflection mirror with the center of the mount being in alignment with the central axis of the reflection mirror because by recessing the light-emitting device the emission surface of the LED is recessed as well. When the emission surface is recessed, more surface area of the reflection mirror is utilized because the light emitted from the LED diffuses more efficiently. And by centering the recess, the amount of light reflected is maximized.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Gemmell whose telephone number is (703) 305-1937. The examiner can normally be reached on Monday-Thursday 6:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (703) 308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


emg


EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER